

south-west there occurs at this season of the year in Labrador, the Hudson's Bay territories and the Arctic Archipelago, so great a fall of temperature, that the mean temperature of January sinks from -20° to -35° C.; to the east and south-east, on the contrary, the Gulf Stream, even in mid-winter, maintains the temperature in the Atlantic at from 0° to 5° C., so that the superincumbent air can scarcely be supposed in general to be cooled under the freezing-point. Lying between such opposite varieties of temperature, the climate of Greenland must necessarily be in a high degree dependent on the prevailing direction of the wind at every particular period; all winds from south by west to north-east may bring comparative cold, but east and south-east winds, on the contrary, heat, and this ought specially to hold good of the south-east wind, both because it comes from the warmest part of the neighbouring Atlantic Ocean, and also because it has the shortest way to travel over the ice-deserts of the interior to reach the western coast. The character of the winter in Greenland will therefore certainly depend on whether the south or the east wind has prevailed during the course of it."

These explanations go a great way indeed, but still are not altogether sufficient. "Thus, when at Jacobshavn, shortly before July, 9° C. of heat are recorded during a south-east storm, while the normal temperature is -12° C.; this high temperature cannot be derived alone from the Atlantic nearest in the south-east to Greenland; for it is quite improbable that the air could have so high a temperature at this season, and even if it may be supposed to pass over Greenland in the short space of eight to ten hours, it must by the way suffer a greater or less cooling by contact with the cold ice masses. Indeed if we go down to South Greenland we will there, in the month of December, be able to observe over 14° C. of heat, a temperature which we cannot simultaneously find in the Atlantic much nearer than at the Azores, and it cannot be supposed that the air has travelled from these islands to Greenland with its temperature unchanged."

"There are also other properties, besides its high temperature, which specially characterise the south-east wind in Greenland. For it appears always to be very dry; the snow melts away from the low country without any running water being visible. The storm begins first on the mountain-tops, where the snow is seen whirling high in the air, and then it afterwards works itself down in the fiord valleys."

These relations drew the writer's thoughts to other regions of the earth. On the northern slopes of the Alps a stormy southerly wind sometimes begins to blow very suddenly, which, from the snow-covered summits, hurls itself with irresistible force through the valleys which lead towards the north, and throws the Alpine lakes into frightful commotion. This wind, which is named *Foehn*, has, although it comes from a snowy region, an unusual warmth and dryness. Prof. Dufour has shown that during a *Foehn* which raged during the 24th and 25th September, 1866, the temperature was 6° to 9° C. over the normal in northern Switzerland; indeed at the town of Zug, although it lies 440 metres above the level of the sea, the temperature was higher than it was at the same time both north and south of the Alps. The unusual heat and dryness of the *Foehn* is also shown by the circumstance that the boundary of the snow in the valleys is seen to have receded very considerably when the storm subsides; it is therefore called, on that account, "the great snow melter."

At the same time that the southerly wind is found as a warm and dry *Foehn* on the northern side of the Alps, there blows, on the other hand, on the southern slopes of the mountains a humid sirocco, generally accompanied by an enormous fall of snow.

Several years back Dr. Hann, of Vienna, solved this enigma in a highly satisfactory way.

We know that the pressure of the atmosphere decreases upwards; when, therefore, a mass of air is forced by any cause to raise itself from the surface of the earth to a certain height, it will be subjected to a constantly diminishing pressure, and will accordingly expand, but as every expansion is a work which is accompanied by a consumption of heat, the air is cooled as it rises. As long as the cooling is not greater than that the air can retain its watery vapour, the heat will, according to calculations which have been confirmed by observations, diminish almost exactly 1° C. for every 100 metres the air rises. On the other hand, if the dew-point is exceeded, so that the watery vapour forms clouds, rain, or snow, the moisture will pass from the form of vapour to the fluid or solid state, whereby the combined heat is set free. The cooling from this moment proceeds much more slowly, and it may, within the limits of which we have experience, be stated as about $\frac{1}{5}^{\circ}$ C. for every 100 metres.

When a mass of air, on the contrary, sinks towards the surface of the earth, it comes under higher pressure, is compressed, and consequently heated. Its temperature will rise more and more above the dew-point, and moisture will, with continually increasing ease, be held dissolved in the state of vapour. The heating during the whole descent will be 1° C. for every 100 metres.

These physical laws explain the properties of the *Foehn*. The air comes from the Mediterranean saturated with moisture, and passes over the summits of the Alps.

"Leaving out of consideration the cooling which goes on by the way, partly by radiation, partly by contact with mountain masses, a simple calculation will give the result that the temperature of a south wind will be about as many half degrees Centigrade higher at the north foot of the Alps than at the south foot, as the height of the mountain chain contains hectometres, for it is lowered half a degree for every 100 metres ascent, but raised one degree for every 100 metres descent."

These phenomena repeat themselves on Greenland. The writer sketches in detail a *Foehn* period which lasted eighteen to twenty days in the end of November and beginning of December, 1875. Jacobshavn was then for quite eight days warmer than North Italy. Upernivik, which lies about 10° to the south of the English North Pole Expedition's wintering station, was during the darkness of the Polar night warmer than the south of France. Unfortunately all direct observations from the uninhabited east coast of Greenland and the nearest parts of the Atlantic are wanting; but it may, however, be shown that during the period referred to a strong south-east wind blew from the sea over the land. For the so-called Buys-Ballot law in its simplest form teaches that the wind always blows so that it has the greater pressure of the atmosphere on its right, and that the more unequally the pressure is distributed the greater is the velocity of the wind. Now just during the days in question the barometer was much higher in Iceland than at Davis Straits. Over the tract lying between these places there had thus prevailed a strong south-east wind.

NOTES

OUT of above ninety candidates, Mr. James Edward Henry Gordon, B.A., of Caius College, Cambridge, has been selected by the Council of the British Association to be recommended to the Association as Mr. Griffith's successor in the important position of Assistant Secretary.

THE fiftieth *Versammlung deutscher Naturforscher und Aerzte* takes place at Munich on September 18-22. The following is the general programme:—Sept. 17, evening: Social gathering in the large saloon of the Rathhaus. 18: General session in the Odeon; address of welcome from Dr. v. Pettenhofer, addresses by Prof. Waldeyer, of Strassburg, on "C. v. Baer and his

Importance in the History of Evolution," and by Prof. Häckel, of Jena, on "The Present Theory of Evolution in its Relations to General Science." 19: Sessions of the sections. 20: General session; addresses by Prof. Tschermak, of Vienna, on "The Early History of the Earth;" by Prof. Klebs, of Prague, on "The Changes in Medical Theories during the Last Decade;" and by Dr. Neumayer, of Hamburg, on "The Relations of Meteorology to Every-day Life." Afternoon: Visits to the scientific collections. Evening: "Kellerfest." 21: Sessions of the sections. 22: Addresses by Dr. Avé Lallemant, of Lübeck, on "Animal Life on the Amazon;" by Prof. Günther, of Ansbach, on "The Latest Researches in the Mathematico-Historical Department;" and by Prof. Virchow, of Berlin. Expedition to the Stornbörger See.

THE forty-fifth annual meeting of the British Medical Association was opened on Tuesday at Manchester. A general meeting was held in the concert-hall, when the president, Dr. de Bartolome, of Sheffield, delivered an address. Dr. Wilkinson, of Manchester, was elected president for the ensuing year. In the evening a reception by the president of the Association and the Senate and Council of Owens College took place at that institution.

THE annual congress of the Royal Archæological Society of Great Britain and Ireland was opened at Hereford on Tuesday. After a public reception in the library and the presentation of a congratulatory address, the Bishop of Hereford, the local president, formally opened the proceedings. Sir Gilbert Scott delivered a lecture on the cathedral, and afterwards, in the cathedral itself, a historical and architectural description of the fabric. On the same day the annual meeting of the Cambrian Archæological Association was opened at Carnarvon, under the presidency of Lord Clarence Paget. The inaugural address was delivered by Prof. Babbington, who dwelt on the great advance of archæological science in North and South Wales. The Bishop of St. Asaph was elected president for the ensuing year, and the Hon. J. G. Wynn, hon. secretary for North Wales.

As we announced some weeks ago, the fifth periodical international Congress of the Medical Sciences takes place in Geneva on the 9th to the 15th September proximo. Among other subjects to be treated, we note:—Influence of alcohol on mental disease, influence of immigration from the country to towns, tuberculosis on the mountains and the Mediterranean coast, physical characters of the electric discharge of the torpedo, cerebral localisations, cause of sleep, functions of the spleen, physiological antagonism.

THE German Anthropological Society holds its eighth annual congress at Constance on September 26.

THE death is announced of Mr. Robert Were Fox, F.R.S., of Falmouth, in his eighty-eighth year. Mr. Fox is known as the author of various observations, especially in connection with geology and mining. Early in the century he made important observations on the ratio of the decrease of temperature in the earth, and at a later period published various papers in connection with magnetism and electricity. Mr. Fox was widely known among men of science, and universally respected.

THE honour of knighthood is to be conferred on Vice-Admiral Erasmus Ommanney, C.B., F.R.S., Vice-Admiral Edward Augustus Inglefield, C.B., F.R.S., and Rear-Admiral George Henry Richards, C.B., F.R.S., the late Hydrographer to the Admiralty.

A NUMBER of German scientific men have united to form a committee for the purpose of collecting a sufficient sum to erect a statue of the lately deceased botanist, Alexander Broun.

IN the House of Commons, on Tuesday, Mr. A. Egerton stated that the papers relating to the transit of Venus were in the hands of the printers, and he hoped that it would not be very long before they were in the hands of members.

IN connection with Capt. Howgate's proposed polar colony, a preliminary expedition in the U.S. schooner *Florence* was to start from New London on July 25, under the command of Capt. Tyson, of the *Polaris*. The object of the expedition is to engage a dozen Esquimaux families to be conveyed to Robeson Straits by the colonial expedition, to purchase dogs, native sledges, and a supply of clothing. The place of meeting appointed is Disco, where the colonists from America, it is hoped, will arrive early next spring.

A LETTER has been received by Dr. G. Bennett (now in London) from Signor D'Albertis, dated Somerset, Northern Australia, May, 2, 1877, in which he says, "I am ready to start for the Fly River, New Guinea, and intend to leave in the steam launch *Neva* to-morrow morning, if the weather is fine. My crew consists of five Chinese, three South Sea Islanders, and an engineer. I shall write to you whenever I have an opportunity."

FROM July 1 to July 14 a Dutch pilot schooner, which was fitted out for the purpose, made a short cruise through the North Sea, having on board five gentlemen, all members of the Netherlands Zoological Society, who completed a series of about forty dredgings in different localities. Heligoland was the farthest point reached in a northern and eastern direction. There seems to be good reason to be satisfied with the results which at this moment are being worked out at the Zoological Summer Station erected at Flushing for the season of 1877. That youthful establishment was represented on board by three of its committee members, Drs. Horst, Hoek, and Hubrecht. The vessel had been put at their disposal by government.

THERE will be arranged at Havre on the occasion of the forthcoming session of the French Association for the Advancement of Science, an Archæological and Geological Exhibition of Normandy. It will be divided into six sections, one of them relating exclusively to prehistoric ages.

DR. SACHS, who was sent to Venezuela by the Berlin Academy of Sciences, for the purpose of studying the electric eel in its native haunts, and whose progress we have already chronicled, has now returned, after an absence of ten months, with a rich store of valuable observations, which will shortly be laid before the academy.

PROF. FREDRICK WAHLGREN, who has occupied the chair of zoology for twenty years in the University of Lund, died during the past month in his fifty-eighth year.

THE Dutch Geographical Society has received a report from the expedition recently sent out to explore Sumatra. One division left Padary in the middle of May for the mountainous centre of the island. They have successfully penetrated into these hitherto unknown regions, and describe them as of surpassing grandeur. The mountain sides are clothed to the very top with a most luxuriant forest growth, almost impenetrable to the sun's rays. The inhabitants consist of a few utterly degraded Malays gathered together in wretched villages. The health of the expedition is excellent.

PETERMANN'S *Mittheilungen* for August, contains an important article, with map, by Dr. Schunke, on the navigable water-ways of Germany, with special reference to the canals. Dr. Polakowsky's paper on the vegetation of Costa Rica is continued, and accompanying a large-scale chart is an account of the examination of the mouth of the Congo by Commander Medlicott and Lieut. Flood in 1875. Nearly one half of the number is occupied with Behn's monthly *résumé* of Geographical

news, now one of the most important features in this valuable journal.

NEWS has been received in Europe of an eruption of the volcano Cotopaxi, near Quito. An immense quantity of ashes was ejected, principally in the direction of Guayaquil, falling on board ships sailing from Guayaquil to Panama. The distance was, in some instances, reckoned at 1,000 miles.

DURING the month of July an important series of longitudinal measurements have been carried out between the Bureau des Longitudes in Paris and the königliches geodätisches Institut in Berlin. The difference of longitude is now based on the mean of twelve carefully carried out observations. A series of observations between Paris and Bonn, and between Bonn and Berlin, which are to be undertaken during the present month, will act as a check on the work.

WE have received a "Sketch Guide to the Industrial Museum of Glasgow," by Mr. James Paton, Superintendent of the Museum. As the museum is at present incomplete but rapidly filling up, the Guide is only a temporary one. It is compiled on a somewhat novel but instructive and intelligent plan.

SEYDEL AND CO.'s hammocks, to which we referred in a recent number, have been awarded the gold medal for excellence at the International Horticultural Exhibition, Oporto.

WE have received from the enterprising firm of Mawson and Swan, of Newcastle, specimens of magic pens which not only write without ink but in different colours. It is not necessary that we should state the many arguments advanced to prove their vast superiority over those used at present, but it is very clear that they will be very useful to travellers whether the arguments in question are sound or otherwise.

AT a recent meeting of the Paris Geographical Society a letter from M. C. Wiener, who is travelling in South America at the expense of the French Government, was read, describing his ascent, on May 19, of Mount Illimani, whose height he makes out to be 20,112 feet. M. Wiener reached the summit, which he named Pic de Paris. Mr. Minchin, however, a railway engineer, who has been taking careful measurements of some of the South American peaks, gives the height of Illimani as 21,224, Wiener's figure being obtained by aneroid and boiling water.

A MOVEMENT is on foot for a union of the natural history societies in the Midland District on a similar basis to that which has worked so well in the case of the West Riding Consolidated Naturalists' Society. A number of societies, representing nearly a thousand members, have given their adhesion to the movement, and a meeting is to be held at the Birmingham Midland Institute on August 28 to discuss the programme of the union, the journal, and other matters.

THE pupils of the Parisian schools, who have obtained prizes in their respective classes, are to be sent on a pleasure trip to the seaside, under the direction of several masters, who are instructed to give them lectures on the places they may be visiting. This idea has been formerly acted on, but is now being tried on an enlarged scale.

THE Japanese Government have built, at their own expense, and through Japanese operatives, a war balloon. It has been tried successfully at Tokio, and will be sent to the southern army, which is directed against rebels. It is of thick silk, magnificently made, and will be inflated with pure hydrogen.

PARTS 50 and 60, completing the fifth volume of Mr. H. E. Dresser's great work on "The Birds of Europe," have been issued; and as there is but one more volume to come we may look forward with confidence to the completion of the entire

undertaking in the course of next year. The present issue contains sixteen plates which are fully equal in accuracy and colouring to any that have preceded them, the gulls and terns, of which eight species are here figured, being especially beautiful. A provisional index to the five volumes now finished shows that 471 species of birds have now been figured and described.

IN the last number of the *Zoologische Garten* it is announced that a second specimen of *Archæopteryx lithographica* had been discovered. Twenty years have passed since the original and hitherto unique example of this wonderful bird of bygone days was obtained by Ernst Haeberlein in the quarries of Pappenheim, near Solenhofen. The second specimen, discovered in the same place and by the same observer, is said to be much more perfect than the first, and to possess the entire head—a knowledge of which is much wanted for the better understanding of the affinities of this extraordinary organism.

THE electrical illumination of the Lyons railway station is being completed. They are now using twelve electric lamps. This number will be enlarged successively to twenty-four lamps, fed with one light-producing and one light-distributing machine. It is believed that twenty-two horse-power will give a power of 2,400 gas-lamps, using 100 litres each per hour.

IN a little official guide-book to the Rothesay Royal Aquarium, Mr. Barker, the curator, has brought together, in a popular and attractive form (for non-visitors as well as visitors), a good deal of useful information about the various fishes. The example is worthy of imitation.

THE news of the discovery of a perfect mammoth in Toms is false. M. Polyakoff sent immediately by the St. Petersburg Academy, writes that he found only a large piece of mammoth flesh with skin and hair.

WE notice in the *Memoirs* of the St. Petersburg Academy, vol. xix., an interesting Russian paper by M. S. Lopatin, "Some Notes on the Ice-sheets in the Rocks of Eastern Siberia." The paper is the result of widely-extended observations made by the author during his numerous travels in Eastern Siberia (basin of Vitim, lower Yenissei, government Krasnoyarsk, &c.), and on the Sakhalin Island.

THE report of Dr. Schomburgk on the "Progress and Condition of the Botanic Garden and Government Plantations" at Adelaide, for 1876, has this year a similar feature to that of the recently-noticed report of Kew, inasmuch as it is illustrated; but in the case of that of Adelaide, with eight photographic views of different parts of the garden, external and internal views of the new palm-house, &c.; and a full description of this building is given. With regard to the prosperity of the garden, the greatest enemy, Dr. Schomburgk tells us, that it has had to contend with has been a very severe frost. The lowest temperature during the month of July was 28° Fahr., the lowest, indeed, ever experienced in Australia by Dr. Schomburgk. As might be imagined these severe frosts had a most disastrous effect upon most of the tropical plants, more especially on species of *Ficus*, many of which suffered so much that they were compelled to be cut down to two-thirds of their size, so that it will be years before they assume their former beauty, if ever they do. The frost made itself felt even in the glass-houses, and blackened the leaves of the plants standing near the glass, and the fountain basins were all covered with ice. Amongst useful plants which have occupied the attention of Dr. Schomburgk, the madder (*Rubia tinctorum*) seems to be amongst the most successful, so far as its rate of growth is concerned. It is stated to grow so vigorously about Adelaide that, "if not checked, it will become a nuisance, spreading everywhere." Its value is stated to be very great as a dye, and worth while cultivating, but we are under the impression that the aniline dyes have, to a great extent, and

are still, indeed, driving madder out of the market. Attention will, no doubt, be centred upon other and more profitable plants. With regard to the routine work of the gardens, that is the distribution of seeds and plants, it does not compare badly with botanic gardens of greater pretension, for we learn that nineteen Wardian cases were dispatched during the year, containing about 800 stove and greenhouse plants, besides which 1,500 packets of seeds were also distributed to all parts of the world.

THERE is in the valley of the Maota in Switzerland, a grotto penetrating the mountain, and called the *Lauiloch*. It had not been explored beyond the Gorge du Loup, but recently some venturesome young people of Ilgau have traversed this passage, and have penetrated, it is said, two whole leagues into the mountains, crossing various cavities where human foot had never trod before. They came at last to a deep fissure, which they could not explore, being without cords or ladders. A society has been formed for further exploration of the region, and the results will be published shortly.

IN a paper recently read to the Franklin Institute, Prof. Ennis gives the excellent advice to teachers that every day when the last half-hour of school-time arrives, the pupils should take their seats closely in front of the teacher's table, and he should then perform some scientific experiment, or exhibit some object of natural history, and tell all that can well be told about it. The pupils will make the more rapid progress in all their primary studies in consequence. The enjoyment of these scientific lectures is like dessert after dinner.

A PECULIAR kind of industry, that of breeding maggots, has lately been tried in Paris. Over the soil were spread large quantities of stale fish, dead lobsters, odorous poultry, and other refuse of the markets, as much as half a ton of large fish being taken on the premises in a single day. The maggots, which soon became abundant, were carefully picked out and packed in casks of galvanised iron, and finally were sold for fish bait and chicken food. The remaining refuse was converted into manure. Proximity to such an establishment could not have been very pleasant, and exposed provisions in the neighbourhood suffered largely from the visits of numberless flies. The police stepped in and suppressed the manufacture.

THE inhabitants of the Upper Engadine, one of the most attractive sites in Switzerland, have passed an order forbidding to sell or destroy a local wild-flower, which is called *Edelweiss*, and well-known to botanists. The destruction was so active that *Edelweiss* was fast disappearing.

THE three-yearly session of the International Congress for measuring the figure of the earth will take place at Stuttgart in the last days of September, under the presidency of Gen. Hanez, a Spaniard. The vice-president is Prof. Bauernfeind, late director of Munich Polytechnic School. It is said that France for the first time will join the Congress, and will be represented by Capt. Mouchez and Loewy, two members of the Bureau des Longitudes.

THE following list of candidates successful in the competition for the Whitworth Scholarships, 1877, has been published by the Science and Art Department. William I. Last, Mechanical Engineer; F. Ogden, Mechanic; W. F. How, Engineer; W. S. McKenzie, Engineer; A. D. Ottewell, Draughtsman; D. A. Low, Engineer.

THE laboratories of the experimental farm at Vincennes, belonging to the French National School of Agriculture, were inaugurated the other day by the Minister of Public Instruction of the French Republic.

THE *Report* of the Royal Society of Tasmania contains among other papers of interest several important papers on Tasmanian shells by the Rev. J. E. Tenison-Woods.

THE bones of the bird hitherto known as *Tithornis emuinus* recently found at Sheppey, have enabled Prof. Owen to conclude that it was one with enormous wings, closely allied to, and much larger than, the albatross. The Professor, who has a paper on the subject in preparation, proposes to substitute a more appropriate name than the one given by Bowerbank. The bones are in the private collection of Mr. W. H. Shrubsole, of Sheerness-on-Sea, by whom they were found.

PROF. LANGLEY contributes to the *American Journal of Science and Arts* for July, an interesting paper "On the possibility of transit observations without personal errors."

THE Committee Report on the annual prize distribution of the French Société de Géographie appears in the Society's *Bulletin* for June. The recipients (to whom medals, &c., were awarded in April) are Lieut. Cameron, M. Roudaire, MM. de Folin and Leon Perrier, and M. Gravier; an account is given of the work of these investigators.

WE notice the appearance of a most interesting Russian work in the *Bulletin* of the Moscow Society of Friends of Natural Science, being a "Description of the various Zoological Gardens of Europe." The work is a collection of reports upon the most important zoological gardens, made by zoologists specially sent for that purpose, during 1876, by the Society above mentioned and by the Society of Acclimatisation, in order to find the best scheme for the organisation of the Zoological Gardens of Moscow. The introduction to the work is written by Prof. Bogdanoff.

THE additions to the Zoological Society's Gardens during the past week include a Grivet Monkey (*Cercopithecus griseo-viridis*) from Africa, presented by Mr. J. Harvey; a Weeper Capuchin (*Cebus capucinus*) from Brazil, presented by Mrs. Cameron; a Wood Brocket (*Cervus nemorivagus*) from Caura, presented by Mr. C. C. Berington; an Oil Bird (*Steatornis caripensis*) from Trinidad, presented by Mr. W. G. de Voëux; a White Goshawk (*Astur nova hollandiae*), a Berigora Hawk (*Hieracidea berigora*) from Australia, presented by Major Spicer; a Harpy Eagle (*Thrasaetus harpyia*), a Great-billed Rhea (*Rhea macrorhyncha*) from South America, received in exchange; an Axis Deer (*Cervus axis*) born in the gardens.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE

SCIENCE AT KING'S COLLEGE, LONDON.—We understand that the Council of King's College have established a Science Course, including those subjects which, according to the new regulations, are required of candidates for the First B.Sc. or for the Preliminary Science Examinations of the University of London. Candidates for the Indian Civil Service, for the Home Civil Service, for the Indian Public Works Department, for the Royal Military Academy at Woolwich, and for other public examinations, will find in the course the scientific subjects which are required for those examinations. The course of study is under the direction of Prof. W. G. Adams. In addition to teaching and lectures in the several subjects, there will be included in the course Demonstrations and Practical work in the Physical, the Chemical, and the Biological Laboratories. The subjects for first year students in this course will be Mathematics, Elementary Mechanics, Physics, Chemistry, Zoology, and Botany, with practical work in each of the three laboratories. The second year's course will include these subjects with Geology.

EDINBURGH.—The Summer Session has just closed. In point of numbers the session 1876-77 has been the most prosperous the university has ever enjoyed, there being no fewer than